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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,110

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Masataka Nakamura

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MORRISON & FOERSTER LLP  
1650 TYSONS BOULEVARD  
SUITE 400  
MCLEAN, VA 22102

EXAMINER

MOHADDES, LADAN

ART UNIT

PAPER NUMBER

1795

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/562,110	<b>Applicant(s)</b> NAKAMURA ET AL.	
	<b>Examiner</b> LADAN MOHADDES	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 01 February 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>07/13/2006; 04/20/2010; 07/12/2010</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 18 recites “ ... fuel further comprises water and the dimethyl ether has a carbon number of 1 to 3”. Dimethyl ether is the organic compound with the formula  $\text{CH}_3\text{OCH}_3$  and therefore the carbon number is known. For the purpose of the compact prosecution the examiner has interpreted the claim as so that the fuel comprises water and dimethyl ether.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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4. Claims 1-9, 12-14 and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Cabasso et al. (US 6103414, already of record, hereafter referred to as CABASSO).

With respect to claims 1-9, 12-14 and 16-17, CABASSO discloses a solid polymer electrolyte membrane for fuel cell (as in claim 1, 12-14 and 16-17) comprising: sulfonated poly phenylene oxide blended with poly vinylidene fluoride (Applicant's polymer A and B, respectively, as in claims 1-9) (col 5: ln 49-56). It is the position of the examiner that the amount of unfreezable water is inherently within the range disclosed by the applicant (as in claims 1 and 2), if the polymer blends used in the prior art reference are comprised from the polymer compounds disclosed by the applicant.

5. Claims 1-9, and 12-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Prakash et al. (US 6444343, already of record, hereafter referred to as PRAKASH).

With respect to claims 1-9, and 12-17, PRAKASH discloses a solid polymer electrolyte membrane for methanol fuel cell (as in claim 1, 12-17) comprising: polystyrene sulfonic acid blended with poly vinylidene fluoride (Applicant's polymer A and B, respectively, as in claims 1-9) (col 5: ln 21-27, ln 36-42 and ln 51-52). It is the position of the examiner that the amount of unfreezable water is inherently within the range disclosed by the applicant (as in claims 1 and 2) if the polymer blends used in the prior art reference are comprised from the polymer compounds disclosed by the applicant.

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6. Claims 1-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Campbell et al. (EP 0224020, already of record, hereafter referred to as CAMPBELL).

With respect to claims 1-11, CAMPBELL discloses a polymer comprising: polyphenylene ethers (oxide) (as in claims 1-3 and 5-8) or poly alkylene dicarboxylate (as in claim 4) (pages 5, 8, and 12, Applicant's polymer A) and polysiloxane with formula VIII (pages 16-17) (as in claims 1 and 9-11, applicant's polymer B). It is the position of the examiner that the amount of unfreezable water is inherently within the range disclosed by the applicant (as in claims 1 and 2), if the polymer blends used in the prior art reference are comprised from the polymer compounds disclosed by the applicant. Also, as stated in *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305, 51 USPQ2d 1161, 1165 (Fed. Cir. 1999) "if the body of a claim fully and intrinsically sets forth all of the limitations of the claimed invention, and the preamble merely states, for example, the purpose or intended use of the invention, rather than any distinct definition of any of the claimed invention's limitations, then the preamble is not considered a limitation and is of no significance to claim construction".

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1-14 and 16-17 are rejected are rejected under 35 U.S.C. 103(a) as being unpatentable over Campbell et al. (EP 0224020, already of record, hereafter referred to as CAMPBELL) in view of Cabasso et al. (US 6103414, already of record, hereafter referred to as CABASSO).

With respect to claims 1-14 and 16-17, CAMPBELL discloses a polymer comprising: polyphenylene ethers (oxide) (as in claims 1-3 and 5-8) or poly alkylene dicarboxylate (as in claim 4) (pages 5, 8, and 12, Applicant's polymer A) and

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polysiloxane with formula VIII (pages 16-17) (as in claims 1 and 9-11, applicant's polymer B). It is the position of the examiner that the amount of unfreezable water is inherently within the range disclosed by the applicant (as in claims 1 and 2), if the polymer blends used in the prior art reference are comprised from the polymer compounds disclosed by the applicant. CAMPBELL does not expressly disclose that the polymer is a polymer electrolyte. However, CABASSO teaches copolymers of poly phenylene oxide for use as polymer electrolyte membrane for fuel cells (as in claim 1 and 12-14 and 16-17) for the benefit of having a low cost, easy to prepare ion-exchange membrane with favorable mechanical and chemical properties for use in fuel cells. Therefore, it would have been obvious for the person of ordinary skills in the art at the time the invention was made to use the copolymer of CAMPBELL as a polymeric membrane in fuel cell of CABASSO for achieving favorable mechanical and chemical properties.

11. Claims 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cabasso et al. (US 6103414, already of record, hereafter referred to as CABASSO) as applied to claims 1-9, 12-14 and 16-17 above, and further in view of Muller (US 6777116, hereafter referred to as MULLER).

With respect to claims 15 and 18, CABASSO does not expressly disclose a direct type fuel cell with water and dimethyl ether as the fuel. However, as shown by Muller direct type fuel cells comprising proton conducting electrolyte using water and dimethyl

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ether or methanol as fuel are well known in the art (col 3: ln 38-52). As stated rationales in *KSR International v. Teleflex Inc.* (550 USPQ2d 1385):

- (a) Combining prior art elements according to known methods to yield predictable results;
- (b) Simple substitution of one known element for another to obtain predictable results;
- (c) Use of a known technique to improve similar devices, methods, or products in the same way;
- (d) Applying a known technique to a known device, method, or product ready for improvement to yield predictable results;
- (e) "Obvious to try" - choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- (f) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- (g) Some teaching, suggestion, or motivation to combine prior art references that would have led one of ordinary skill to modify the prior reference teachings to arrive at the claimed invention;

establish a prima facie case of obviousness. Therefore, it would have been obvious for the person of ordinary skills in the art at the time the invention was made to use direct type fuel cells with dimethyl ether/methanol and water fuel cells with the polymer electrolyte membrane of CABASSO as so is within the design choice of the practitioner



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in the art. The Examiner notes that above rationales are merely exemplary. For more information, see MPEP § 2141.

12. Claims 15 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Campbell et al. (EP 0224020, already of record, hereafter referred to as CAMPBELL) in view of Cabasso et al. (US 6103414, already of record, hereafter referred to as CABASSO), and further in view of Muller (US 6777116, hereafter referred to as MULLER).

With respect to claims 15 and 18, CAMPBELL in view of CABASSO does not expressly disclose a direct type fuel cell with water and dimethyl ether as the fuel. However, as shown by Muller direct type fuel cells comprising proton conducting electrolyte using water and dimethyl ether or methanol as fuel are well known in the art (col 3: ln 38-52). As stated rationales in *KSR International v. Teleflex Inc.* (550 USPQ2d 1385):

- (a) Combining prior art elements according to known methods to yield predictable results;
- (b) Simple substitution of one known element for another to obtain predictable results;
- (c) Use of a known technique to improve similar devices, methods, or products in the same way;
- (d) Applying a known technique to a known device, method, or product ready for improvement to yield predictable results;

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- (e) "Obvious to try" - choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- (f) Known work in one field of endeavor may prompt variations of it for us in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- (g) Some teaching, suggestion, or motivation to combine prior art references that would have led one of ordinary skill to modify the prior reference teachings to arrive at the claimed invention;

establish a prima facie case of obviousness. Therefore, it would have been obvious for the person of ordinary skills in the art at the time the invention was made to use direct type fuel cells with dimethyl ether/methanol and water fuel cells with the polymer electrolyte membrane of modified CAMPBELL as so is within the design choice of the practitioner in the art. The Examiner notes that above rationales are merely exemplary. For more information, see MPEP § 2141.

13. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prakash et al. (US 6444343, already of record, hereafter referred to as PRAKASH) as applied to claims 1-9 and 12-17 above, and further in view of Muller (US 6777116, hereafter referred to as MULLER).

With respect to claim 18, PRAKASH discloses direct methanol fuel cell (col 3: In 28-32) but does not expressly disclose water and dimethyl ether as the fuel. However, as shown by Muller direct type fuel cells comprising proton conducting electrolyte using

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water and dimethyl ether as fuel are well known in the art (col 3: ln 38-52). As stated rationales in *KSR International v. Teleflex Inc.* (550 USPQ2d 1385):

- (a) Combining prior art elements according to known methods to yield predictable results;
- (b) Simple substitution of one known element for another to obtain predictable results;
- (c) Use of a known technique to improve similar devices, methods, or products in the same way;
- (d) Applying a known technique to a known device, method, or product ready for improvement to yield predictable results;
- (e) "Obvious to try" - choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- (f) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- (g) Some teaching, suggestion, or motivation to combine prior art references that would have led one of ordinary skill to modify the prior reference teachings to arrive at the claimed invention;

establish a prima facie case of obviousness. Therefore, it would have been obvious for the person of ordinary skills in the art at the time the invention was made to use direct dimethyl ether and water as fuels for fuel cell of PRAKASH as so is within the choice of

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the practitioner in the art and thought by prior art. The Examiner notes that above rationales are merely exemplary. For more information, see MPEP § 2141.

***Correspondence/Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LADAN MOHADDES whose telephone number is (571)270-7742. The examiner can normally be reached on Monday to Thursday from 8:30 AM to 6:00 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LADAN MOHADDES/

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Examiner, Art Unit 1795

/Patrick Joseph Ryan/

Supervisory Patent Examiner, Art Unit 1795